ANNEX 02
BETWEEN
THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
LYNDON B. JOHNSON SPACE CENTER
AND GENERAL MOTORS, LLC
UNDER SPACE ACT UMBRELLA AGREEMENT
NO. 30119, DATED MAY 2019.

ARTICLE 1. PURPOSE

This Annex shall be for the purpose of engineering evaluation, analysis, and testing of the Partner's large format battery cells using NASA's advanced battery test chamber. NASA's Energy Systems Test Area (ESTA) has the unique capabilities to provide these services, due to the rigorous requirements for human-rated batteries for deep space exploration.

ESTA has unique capabilities that are not available in the commercial marketplace. It has the Gas Chromatography (GC) system that needs to reside in the test area where the thermal runaway of the cell occurs. It also has unique battery containment chambers that are designed to contain all the vent products produced from thermal runaway on a cell. This chamber has custom designed, over-charge systems. These include thermal measurements, an in-chamber camera, chamber pressure measurements and the ability to safely scrub the contents of the abused battery. The chamber required for this test is a unique, only-NASA asset with the above mentioned features as well as thermal stability systems, battery cycling systems and all support processes to safely dispose of test assets.

For analysis and thermal modeling purposes, during abusive and destructive tests of cells and modules, large amounts of data needs to be taken. Voltages, currents, and temperatures of individual cells, modules, banks and strings need to be collected. Videos, thermographic videos and pictures need to be taken. All the data needs to be collected during the thermal runaway process. This makes it necessary for high channel count, high-speed, data acquisitions systems and cameras to be located in the test area where the abuse testing occurs. The cycling of selected lithium-ion cells need to occur in thermal, thermal-vacuum and vibrations environments. This requires systems capable of charging and/or discharging a large number of cells to be co-located with chambers and test systems that can produce these environments. The combination of these systems make the ESTA facilities unique.

The activities in this agreement are also in alignment with two goals from the NASA Strategic Plan 2018: Goal 2, "Extend Human Presence Deeper into Space and to the Moon for Sustainable Long-Term Exploration and Utilization," and Goal 3, "Address National Challenges and Catalyze Economic Growth." These activities will help NASA evaluate future types of battery cells for human space missions, and will allow the Partner to further develop their large format battery cells.

This agreement directly supports the Domain Implementation Plan (DIP) 3.3.2 International Space Station (ISS) Battery Surveillance for NASA JSC Engineering.

The legal authority for this Annex, consistent with the Umbrella Agreement, is in accordance with the National Aeronautics and Space Act (51 U.S.C. § 20113(e)).

In accordance with paragraph C of Article 9 of the Umbrella Agreement, all data first produced by NASA under this Agreement shall be considered Proprietary Data. Advanced battery cell testing data for research and development purposes are considered Proprietary by the Partner. Partner understands the Government has Government Purpose Rights in these data.

In accordance with Article 15, these battery cells are classified as EAR-99. The test data and reports resulting from the testing of the battery cells are not subject to export limitations under the ITAR nor the EAR. In the event of the generation of any data classified other than EAR-99, the parties will notify each other as soon as possible and label such data accordingly.

ARTICLE 2. RESPONSIBILITIES

A. NASA JSC will use reasonable efforts to:

1. Assign a Point of Contact (POC) to manage and conduct the tests required by GM.
2. Complete required paperwork to carry out the test readiness review (TRR) per NASA JSC processes.
3. Develop test plan and processes to test 69 battery cells in over charge, as well as take pressure and GC analysis data.
4. Perform testing of 69 battery cells in over charge, as well as take pressure and GC analysis data.
5. Record all requested data, observations, photos and videos in a format that is requested by GM, including labelling it with the Proprietary Data Notice and any export controlled labels if required.
6. Provide report of test results labelled with the Proprietary Data Notice.
7. Visit General Motors to review testing requirements, facility needs, quantities of test articles, plans for space applications, and the expected TRL of the hardware and the facility.

B. Partner will use reasonable efforts to:

1. Provide 69 battery cells for test operations. These battery cells are considered EAR-99.
2. Participate in test objective and test matrix development.
3. Participate in desired test operations.

ARTICLE 3. SCHEDULE AND MILESTONES

The planned major milestones for the activities for this Annex defined in the "Responsibilities" Article are as follows:

1. NASA develops the test plan, procedure, hazard analysis (HA) and conducts the Test Readiness Review (TRR).	Effective Date (ED) + 4 weeks
2. Partner delivers battery cells to JSC.	ED + 4 weeks
3. Partner supports development of test matrix.	ED + 4 weeks
4. NASA completes test operations.	ED + 24 weeks
5. NASA completes test report.	ED + 36 weeks

ARTICLE 4. FINANCIAL OBLIGATIONS

A. Partner agrees to reimburse NASA an estimated cost of $180,000.00 for NASA to carry out its responsibilities under this Annex.
Each payment shall be marked with NASA Johnson Space Center and Annex 02.

B. NASA will not provide services or incur costs beyond the current funding. Although NASA has made a good faith effort to accurately estimate its costs, it is understood that NASA provides no assurance that the proposed effort under this Annex will be accomplished for the estimated amount. Should the effort cost more than the estimate, Partner will be advised by NASA as soon as possible. Partner shall pay all costs incurred and have the option of canceling the remaining effort, or providing additional funding in order to continue the proposed effort under the revised estimate. Should this Annex be terminated, or the effort completed at a cost less than the agreed-to estimated cost, NASA shall account for any unspent funds within one year after completion of all effort under this Annex, and promptly thereafter, at Partner's option return any unspent funds to Partner or apply any such unspent funds to other activities under the Umbrella Agreement.

ARTICLE 5. INTELLECTUAL PROPERTY RIGHTS - DATA RIGHTS

A. Data produced under this Annex which is subject to paragraph C. of the Intellectual Property Rights - Data Rights Article of the Umbrella Agreement will be protected for the period of four years.

B. Under paragraph H. of the Intellectual Property Rights - Data Rights Article of the Umbrella Agreement, Disclosing Party provides the following Data to Receiving Party. The lists below may not be comprehensive, are subject to change, and do not supersede any restrictive notice on the Data provided.
1. Background Data:

The Disclosing Party's Background Data, if any, will be identified in a separate technical document.
2. Third Party Proprietary Data:
The Disclosing Party's Third Party Proprietary Data, if any, will be identified in a separate technical document.
3. Controlled Government Data:
The Disclosing Party's Controlled Government Data, if any, will be identified in a separate technical document.
4. The following software and related Data will be provided to Partner under a separate Software Usage Agreement:
None

ARTICLE 6. TERM OF ANNEX

This Annex becomes effective upon the date of the last signature below ("Effective Date") and shall remain in effect until the completion of all obligations of both Parties hereto, or two years from the Effective Date, whichever comes first, unless such term exceeds the duration of the Umbrella Agreement. The term of this Annex shall not exceed the term of the Umbrella Agreement. The Annex automatically expires upon the expiration of the Umbrella Agreement.

ARTICLE 7. RIGHT TO TERMINATE

Either Party may unilaterally terminate this Annex by providing thirty (30) calendar days written notice to the other Party.

ARTICLE 8. POINTS OF CONTACT

The following personnel are designated as the Points of Contact between the Parties in the performance of this Annex.

Management Points of Contact

NASA Lyndon B. Johnson Space Center
Michael Salinas
Branch Chief
2101 NASA Parkway
Houston, Texas 77058
Phone: 281-483-4595
michael.j.salinas@nasa.gov

GENERAL MOTORS, LLC

Business Point of Contact:
Aida Rodrigues
Manager – Government Contracts
850 North Glenwood Ave.
Pontiac, MI 48340
Phone: 585-303-6601
aida.rodrigues@gm.com

Technical Point of Contact:
Taylor Garrick
VDDV Engineer – Battery Cell Electrochemistry
30500 Mound Rd.
Warren, MI 48092
Phone: 586-662-7129
taylor.garrick@gm.com

ARTICLE 9. MODIFICATIONS

Any modification to this Annex shall be executed, in writing, and signed by an authorized representative of NASA and the Partner. Modification of an Annex does not modify the terms of the Umbrella Agreement.

ARTICLE 10. SIGNATORY AUTHORITY

The signatories to this Annex covenant and warrant that they have authority to execute this Annex. By signing below, the undersigned agrees to the above terms and conditions.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
LYNDON B. JOHNSON SPACE CENTER

JULIE WHITE Digitally signed by JULIE WHITE Date: 2020.11.20 16:04:46 -06'00'

BY:_____
Kevin Window
Director, Engineering

DATE:_____

GENERAL MOTORS, LLC

James E. Hentschel

BY:_____
James E. Hentschel
Vice President, Global Safety, Systems, & Integration

DATE: 10/15/2020